

to suit the needs of patients. Emergency calls, once uncommon, have increased with the passage of therapeutic drug laws expanding optometrists' ability to prescribe medications.

### Employment

Optometrists held about 38,000 jobs in 1998. The number of jobs is greater than the number of practicing optometrists because some optometrists hold two or more jobs. For example, an optometrist may have a private practice, but also work in another practice, clinic, or vision care center. According to the American Optometric Association, about two-thirds of practicing optometrists are in private practice.

Although many optometrists practice alone, a growing number are in a partnership or group practice. Some optometrists work as salaried employees of other optometrists or of ophthalmologists, hospitals, health maintenance organizations (HMO's), or retail optical stores. A small number of optometrists are consultants for industrial safety programs, insurance companies, manufacturers of ophthalmic products, HMO's, and others.

### Training, Other Qualifications, and Advancement

All States and the District of Columbia require that optometrists be licensed. Applicants for a license must have a Doctor of Optometry degree from an accredited optometry school and pass both a written and a clinical State board examination. In many States, applicants can substitute the examinations of the National Board of Examiners in Optometry, usually taken during the student's academic career, for part or all of the written examination. Licenses are renewed every 1 to 3 years and in all States, continuing education credits are needed for renewal.

The Doctor of Optometry degree requires completion of a 4-year program at an accredited optometry school preceded by at least 3 years of preoptometric study at an accredited college or university (most optometry students hold a bachelor's degree or higher). In 1999, 17 U.S. schools and colleges of optometry held an accredited status with the Council on Optometric Education of the American Optometric Association.

Requirements for admission to schools of optometry include courses in English, mathematics, physics, chemistry, and biology. A few schools require or recommend courses in psychology, history, sociology, speech, or business. Applicants must take the Optometry Admissions Test, which measures academic ability and scientific comprehension. Most applicants take the test after their sophomore or junior year. Competition for admission is keen.

Optometry programs include classroom and laboratory study of health and visual sciences, as well as clinical training in the diagnosis and treatment of eye disorders. Included are courses in pharmacology, optics, vision science, biochemistry, and systemic disease.

Business ability, self-discipline, and the ability to deal tactfully with patients are important for success. The work of optometrists requires attention to detail and good manual dexterity.

Optometrists wishing to teach or do research may study for a master's or Ph.D. degree in visual science, physiological optics, neurophysiology, public health, health administration, health information and communication, or health education. One-year postgraduate clinical residency programs are available for optometrists who wish to specialize in any of the following: family practice optometry, pediatric optometry, geriatric optometry, vision therapy, contact lenses, hospital based optometry, primary care optometry, or ocular disease.

### Job Outlook

Employment of optometrists is expected to grow about as fast as the average for all occupations through 2008 in response to the vision care needs of a growing and aging population. As baby boomers age, they will be more likely to visit optometrists and ophthalmologists because of the onset of vision problems in middle age, including computer-related vision problems. The demand for optometric services will also increase because of growth in the oldest age group, with their increased likelihood of cataracts, glaucoma, diabetes, and

hypertension. Employment of optometrists will also grow due to greater recognition of the importance of vision care, rising personal incomes, and growth in employee vision care plans. Employment growth will be fastest in retail optical stores and outpatient clinics.

Employment of optometrists would grow more rapidly were it not for anticipated productivity gains that will allow each optometrist to see more patients. These gains will result from greater use of optometric assistants and other support personnel, and the introduction of new equipment and procedures. New surgical procedures using lasers are available that can correct some vision problems, but they remain expensive.

In addition to growth, the need to replace optometrists who leave the occupation will create employment opportunities. Relatively few opportunities from this source are expected, however, because most optometrists continue to practice until they retire; few transfer to other occupations.

### Earnings

Median annual earnings of salaried optometrists were \$68,500 in 1998. The middle 50 percent earned between \$43,750 and \$93,700 a year. The lowest 10 percent earned less than \$24,820 and the highest 10 percent earned more than \$123,770 a year. Salaried optometrists tend to earn more initially than do optometrists who set up their own independent practice. In the long run, those in private practice usually earn more.

According to the American Optometric Association, new optometry graduates in their first year of practice earned median net incomes of \$55,000 in 1998. Overall, optometrists earned median net incomes of \$92,000.

### Related Occupations

Workers in other occupations who apply scientific knowledge to prevent, diagnose, and treat disorders and injuries are chiropractors, dentists, physicians, podiatrists, veterinarians, speech-language pathologists, and audiologists.

### Sources of Additional Information

For information on optometry as a career and a listing of accredited optometric educational institutions, as well as required preoptometry courses, contact:

✦ American Optometric Association, Educational Services, 243 North Lindbergh Blvd., St. Louis, MO 63141-7881.

Internet: <http://www.aoanet.org>

✦ Association of Schools and Colleges of Optometry, 6110 Executive Blvd., Suite 510, Rockville, MD 20852. Internet: <http://www.opted.org>

The Board of Optometry in each State can supply information on licensing requirements.

For information on specific admission requirements and sources of financial aid, contact the admissions officer of individual optometry schools.

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## Physicians

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(O\*NET 32102A, 32102B, 32102E, 32102F, 32102J, and 32102U)

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### Significant Points

- Physicians are much more likely to work as salaried employees of group medical practices, clinics, or health care networks than in the past.
- Formal education and training requirements are among the longest of any occupation, but earnings are among the highest.

### Nature of the Work

Physicians serve a fundamental role in our society and have an effect upon all our lives. They diagnose illnesses and prescribe and

administer treatment for people suffering from injury or disease. Physicians examine patients, obtain medical histories, and order, perform, and interpret diagnostic tests. They counsel patients on diet, hygiene, and preventive health care.

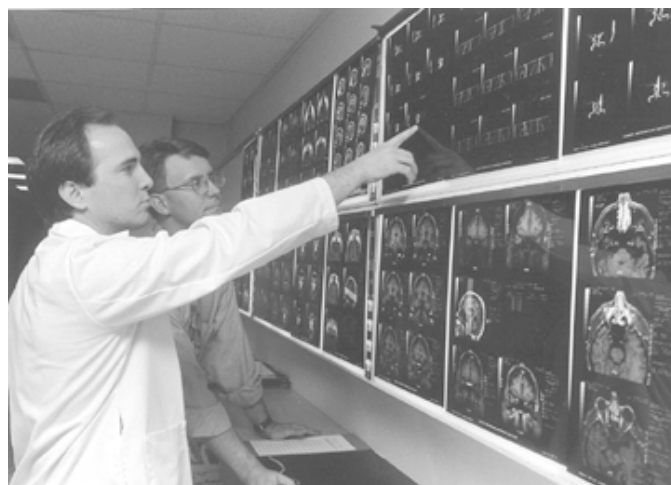
There are two types of physicians: The M.D.—Doctor of Medicine—and the D.O.—Doctor of Osteopathic Medicine. M.D.s are also known as allopathic physicians. While both M.D.s and D.O.s may use all accepted methods of treatment, including drugs and surgery, D.O.s place special emphasis on the body's musculoskeletal system, preventive medicine, and holistic patient care.

About a third of M.D.s—and more than half of D.O.s—are primary care physicians. They practice general and family medicine, general internal medicine, or general pediatrics and are usually the first health professionals patients consult. Primary care physicians tend to see the same patients on a regular basis for preventive care and to treat a variety of ailments. General and family practitioners emphasize comprehensive health care for patients of all ages and for the family as a group. Those in general internal medicine provide care mainly for adults who may have problems associated with the body's organs. General pediatricians focus on the whole range of children's health issues. When appropriate, primary care physicians refer patients to specialists, who are experts in medical fields such as obstetrics and gynecology, cardiology, psychiatry, or surgery (table 1).

**Table 1. Percent distribution of M.D.s by specialty, 1997**

|  | Percent |
|--|---------|
| Total .....                                | 100.0   |
| Primary care                               |         |
| Internal medicine .....                    | 17.0    |
| General and family practice .....          | 10.7    |
| Pediatrics .....                           | 7.3     |
| <i>Medical specialties</i>                 |         |
| Allergy .....                              | .5      |
| Cardiovascular diseases .....              | 2.5     |
| Dermatology .....                          | 1.2     |
| Gastroenterology .....                     | 1.3     |
| Obstetrics and gynecology .....            | 5.2     |
| Pediatric cardiology .....                 | .2      |
| Pulmonary diseases .....                   | .9      |
| <i>Surgical specialties</i>                |         |
| Colon and rectal surgery .....             | .1      |
| General surgery .....                      | 5.4     |
| Neurological surgery .....                 | .6      |
| Ophthalmology .....                        | 2.3     |
| Orthopedic surgery .....                   | 3.0     |
| Otolaryngology .....                       | 1.2     |
| Plastic surgery .....                      | .8      |
| Thoracic surgery .....                     | .3      |
| Urological surgery .....                   | 1.3     |
| <i>Other specialties</i>                   |         |
| Aerospace medicine .....                   | .1      |
| Anesthesiology .....                       | 4.4     |
| Child psychiatry .....                     | .7      |
| Diagnostic radiology .....                 | 2.6     |
| Emergency medicine .....                   | 2.7     |
| Forensic pathology .....                   | .1      |
| General preventive medicine .....          | .2      |
| Neurology .....                            | 1.6     |
| Nuclear medicine .....                     | .2      |
| Occupational medicine .....                | .4      |
| Pathology .....                            | 2.4     |
| Physical medicine and rehabilitation ..... | .8      |
| Psychiatry .....                           | 5.2     |
| Public health .....                        | .2      |
| Radiology .....                            | 1.1     |
| Radiation oncology .....                   | .5      |
| Other specialty .....                      | .8      |
| Unspecified/unknown/inactive .....         | 14.1    |

SOURCE: American Medical Association



*Many physicians work long, irregular hours.*

D.O.s are more likely to be primary care providers than M.D.s, although they can be found in all specialties. Over half of D.O.s practice general or family medicine, general internal medicine, or general pediatrics. Common specialties for D.O.s include emergency medicine, anesthesiology, obstetrics and gynecology, psychiatry, and surgery.

### Working Conditions

Many physicians work long, irregular hours. More than one-third of all full-time physicians worked 60 hours or more a week in 1998. They must travel frequently between office and hospital to care for their patients. Increasingly, physicians practice in groups or health care organizations that provide back-up coverage and allow for more time off. These physicians often work as part of a team coordinating care for a population of patients; they are less independent than solo practitioners of the past. Physicians who are on-call deal with many patients' concerns over the phone, and may make emergency visits to hospitals or nursing homes.

### Employment

Physicians (M.D.s and D.O.s) held about 577,000 jobs in 1998. About 7 out of 10 were in office-based practice, including clinics and Health Maintenance Organizations (HMOs); about 2 out of 10 were employed by hospitals. Others practiced in the Federal Government, most in Department of Veterans Affairs hospitals and clinics or in the Public Health Service of the Department of Health and Human Services.

A growing number of physicians are partners or salaried employees of group practices. Organized as clinics or as groups of physicians, medical groups can afford expensive medical equipment and realize other business advantages. Also, hospitals are integrating physician practices into health care networks that provide a continuum of care both inside and outside the hospital setting.

The New England and Middle Atlantic States have the highest ratio of physicians to population; the South Central States, the lowest. D.O.s are more likely than M.D.s to practice in small cities and towns and in rural areas. M.D.s tend to locate in urban areas, close to hospital and educational centers.

### Training and Other Qualifications

It takes many years of education and training to become a physician: 4 years of undergraduate school, 4 years of medical school, and 3 to 8 years of internship and residency, depending on the specialty selected. A few medical schools offer a combined undergraduate and medical school program that lasts 6 years instead of the customary 8 years.

Premedical students must complete undergraduate work in physics, biology, mathematics, English, and inorganic and organic chemistry. Students also take courses in the humanities and the social sciences. Some students also volunteer at local hospitals or clinics to gain practical experience in the health professions.

The minimum educational requirement for entry to a medical or osteopathic school is 3 years of college; most applicants, however, have at least a bachelor's degree, and many have advanced degrees. There are 144 medical schools in the United States—125 teach allopathic medicine and award a Doctor of Medicine (M.D.) degree; 19 teach osteopathic medicine and award the Doctor of Osteopathic Medicine (D.O.) degree. Acceptance to medical school is very competitive. Applicants must submit transcripts, scores from the Medical College Admission Test, and letters of recommendation. Schools also consider character, personality, leadership qualities, and participation in extracurricular activities. Most schools require an interview with members of the admissions committee.

Students spend most of the first 2 years of medical school in laboratories and classrooms taking courses such as anatomy, biochemistry, physiology, pharmacology, psychology, microbiology, pathology, medical ethics, and laws governing medicine. They also learn to take medical histories, examine patients, and diagnose illness. During the last 2 years, students work with patients under the supervision of experienced physicians in hospitals and clinics to learn acute, chronic, preventive, and rehabilitative care. Through rotations in internal medicine, family practice, obstetrics and gynecology, pediatrics, psychiatry, and surgery, they gain experience in the diagnosis and treatment of illness.

Following medical school, almost all M.D.s enter a residency—graduate medical education in a specialty that takes the form of paid on-the-job training, usually in a hospital. Most D.O.s serve a 12-month rotating internship after graduation before entering a residency which may last 2 to 6 years. Physicians may benefit from residencies in managed care settings by gaining experience with this increasingly common type of medical practice.

All States, the District of Columbia, and U.S. territories license physicians. To be licensed, physicians must graduate from an accredited medical school, pass a licensing examination, and complete 1 to 7 years of graduate medical education. Although physicians licensed in one State can usually get a license to practice in another without further examination, some States limit reciprocity. Graduates of foreign medical schools can usually qualify for licensure after passing an examination and completing a U.S. residency.

M.D.s and D.O.s seeking board certification in a specialty may spend up to 7 years—depending on the specialty—in residency training. A final examination immediately after residency, or after 1 or 2 years of practice, is also necessary for board certification by the American Board of Medical Specialists (ABMS) or the American Osteopathic Association (AOA). There are 24 specialty boards, ranging from allergy and immunology to urology. For certification in a subspecialty, physicians usually need another 1 to 2 years of residency.

A physician's training is costly, and whereas education costs have increased, student financial assistance has not. Over 80 percent of medical students borrow money to cover their expenses.

People who wish to become physicians must have a desire to serve patients, be self-motivated, and be able to survive the pressures and long hours of medical education and practice. Physicians must also have a good bedside manner, emotional stability, and the ability to make decisions in emergencies. Prospective physicians must be willing to study throughout their career to keep up with medical advances. They will also need to be flexible to respond to the changing demands of a rapidly evolving health care system.

### Job Outlook

Employment of physicians will grow faster than the average for all occupations through the year 2008 due to continued expansion of

the health care industries. The growing and aging population will drive overall growth in the demand for physician services. In addition, new technologies permit more intensive care: Physicians can do more tests, perform more procedures, and treat conditions previously regarded as untreatable.

Although job prospects may be better for primary care physicians such as general and family practitioners, general pediatricians, and general internists, a substantial number of jobs for specialists will also be created in response to patient demand for access to specialty care.

The number of physicians in training has leveled off and is likely to decrease over the next few years, alleviating the effects of any physician oversupply. However, future physicians may be more likely to work fewer hours, retire earlier, have lower earnings, or have to practice in underserved areas. Opportunities should be good in some rural and low income areas, because some physicians find these areas unattractive due to lower earnings potential, isolation from medical colleagues, or other reasons.

Unlike their predecessors, newly trained physicians face radically different choices of where and how to practice. New physicians are much less likely to enter solo practice and more likely to take salaried jobs in group medical practices, clinics, and health care networks.

### Earnings

Physicians have among the highest earnings of any occupation. According to the American Medical Association, median income, after expenses, for allopathic physicians was about \$164,000 in 1997. The middle 50 percent earned between \$120,000 and \$250,000 a year. Self-employed physicians—those who own or are part owners of their medical practice—had higher median incomes than salaried physicians. Earnings vary according to number of years in practice; geographic region; hours worked; and skill, personality, and professional reputation. As shown in table 2, median income of allopathic physicians, after expenses, also varies by specialty.

**Table 2. Median net income of M.D.s after expenses, 1997**

|                                 |           |
|---------------------------------|-----------|
| All physicians .....            | \$164,000 |
| Radiology .....                 | 260,000   |
| Anesthesiology .....            | 220,000   |
| Surgery .....                   | 217,000   |
| Obstetrics/gynecology .....     | 200,000   |
| Emergency medicine .....        | 195,000   |
| Pathology .....                 | 175,000   |
| General internal medicine ..... | 147,000   |
| General/Family practice .....   | 132,000   |
| Psychiatry .....                | 130,000   |
| Pediatrics .....                | 120,000   |

SOURCE: American Medical Association

Average salaries of medical residents ranged from about \$34,100 in 1998-99 for those in their first year of residency to about \$42,100 for those in their sixth year, according to the Association of American Medical Colleges.

### Related Occupations

Physicians work to prevent, diagnose, and treat diseases, disorders, and injuries. Professionals in other occupations requiring similar skills and critical judgment include acupuncturists, audiologists, chiropractors, dentists, nurse practitioners, optometrists, physician assistants, podiatrists, speech pathologists, and veterinarians.

### Sources of Additional Information

For a list of allopathic medical schools and residency programs, as well as general information on premedical education, financial aid, and medicine as a career, contact:

☛ Association of American Medical Colleges, Section for Student Services, 2450 N St. NW., Washington, DC 20037-1131.

Internet: <http://www.aamc.org>

For a list of osteopathic medical schools, as well as general information on premedical education, financial aid, and medicine as a career, contact:

☛ American Association of Colleges of Osteopathic Medicine, 5550 Friendship Blvd., Suite 310, Chevy Chase, MD 20815-7321.

Internet: <http://www.aacom.org>

For general information on physicians, contact:

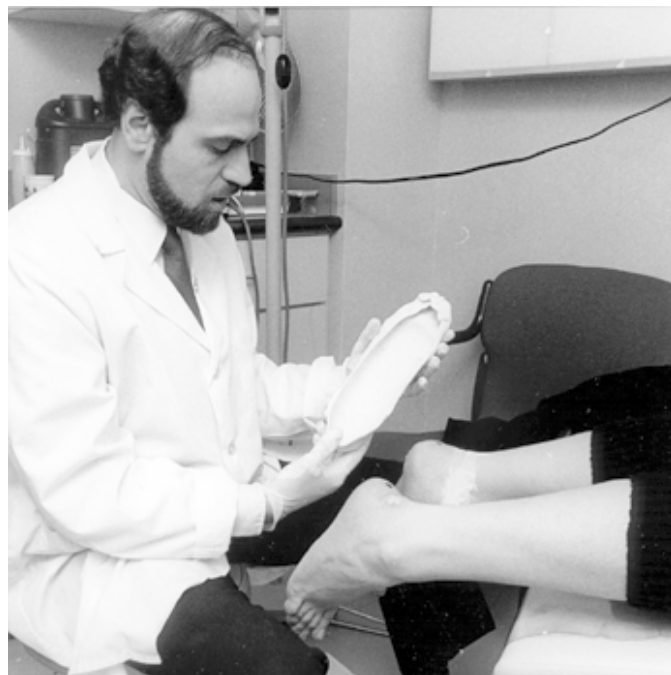
☛ American Medical Association, Department of Communications and Public Relations, 515 N. State St., Chicago, IL 60610.

Internet: <http://www.ama-assn.org>

☛ American Osteopathic Association, Department of Public Relations, 142 East Ontario St., Chicago, IL 60611. Internet: <http://www.aoa-net.org>

Information on Federal scholarships and loans is available from the directors of student financial aid at schools of allopathic and osteopathic medicine.

Information on licensing is available from State boards of examiners.



*Podiatrists use plaster casts to aid in the design of corrective footwear for patients.*

## Podiatrists

(O\*NET 32111)

### Significant Points

- A limited number of job openings for podiatrists is expected because the occupation is small and most podiatrists remain in the occupation until they retire.
- Most podiatrists are solo practitioners, although more are entering partnerships and multi-specialty group practices.
- Podiatrists enjoy very high earnings.

### Nature of the Work

Americans spend a great deal of time on their feet. As the Nation becomes more active across all age groups, the need for foot care will become increasingly important to maintaining a healthy lifestyle.

The human foot is a complex structure. It contains 26 bones—plus muscles, nerves, ligaments, and blood vessels—and is designed for balance and mobility. The 52 bones in your feet make up about one fourth of all the bones in your body. Podiatrists, also known as doctors of podiatric medicine (DPMs), diagnose and treat disorders, diseases, and injuries of the foot and lower leg to keep this part of the body working properly.

Podiatrists treat corns, calluses, ingrown toenails, bunions, heel spurs, and arch problems; ankle and foot injuries, deformities and infections; and foot complaints associated with diseases such as diabetes. To treat these problems, podiatrists prescribe drugs, order physical therapy, set fractures, and perform surgery. They also fit corrective inserts called orthotics, design plaster casts and strapings to correct deformities, and design custom-made shoes. Podiatrists may use a force plate to help design the orthotics. Patients walk across a plate connected to a computer that “reads” the patients’ feet, picking up pressure points and weight distribution. From the computer readout, podiatrists order the correct design or recommend treatment.

To diagnose a foot problem, podiatrists also order x rays and laboratory tests. The foot may be the first area to show signs of serious conditions such as arthritis, diabetes, and heart disease. For example, diabetics are prone to foot ulcers and infections due to

poor circulation. Podiatrists consult with and refer patients to other health practitioners when they detect symptoms of these disorders.

Most podiatrists have a solo practice, although more are forming group practices with other podiatrists or health practitioners. Some specialize in surgery, orthopedics, primary care, or public health. Besides these board-certified specialties, podiatrists may practice a subspecialty such as sports medicine, pediatrics, dermatology, radiology, geriatrics, or diabetic foot care.

Podiatrists who are in private practice are responsible for running a small business. They may hire employees, order supplies, and keep records, among other tasks. In addition, some educate the community on the benefits of foot care through speaking engagements and advertising.

### Working Conditions

Podiatrists usually work in their own offices. They may also spend time visiting patients in nursing homes or performing surgery at a hospital, but usually have fewer after-hours emergencies than other doctors. Those with private practices set their own hours, but may work evenings and weekends to meet the needs of their patients.

### Employment

Podiatrists held about 14,000 jobs in 1998. Most podiatrists are solo practitioners, although more are entering partnerships and multi-specialty group practices. Others are employed in hospitals, nursing homes, the U.S. Public Health Service, and the Department of Veterans Affairs.

### Training, Other Qualifications, and Advancement

All States and the District of Columbia require a license for the practice of podiatric medicine. Each defines its own licensing requirements. Generally, the applicant must be a graduate of an accredited college of podiatric medicine and pass written and oral examinations. Some States permit applicants to substitute the examination of the National Board of Podiatric Examiners, given in the second and fourth years of podiatric medical college, for part or all of the written State examination. Most States also require completion of a postdoctoral residency program. Many States grant